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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,138	11/19/2003	Kevin Delos Parris	2368/91	9179

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EXAMINER	
ODELL, LINDSAY T	

ART UNIT	PAPER NUMBER
1656	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/717,138	PARRIS ET AL.	
	Examiner	Art Unit	
	Lindsay Odell	1656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-13 and 34-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-13 and 34-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *19 November 2003*. 5 May 2005
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *See Continuation Sheet*.

5.0.0

Continuation of Attachment(s) 6). Other: Database sequence comparisons to SEQ ID NO: 1 and SEQ ID NO: 2.

DETAILED ACTION

Application Status

1. The instant Application is a divisional of Application 09/770,834 (issued Patent 6684162). Applicants filed a preliminary amendment on November 19, 2003 canceling claims 8 and 14-33, amending claims 9-13 and adding new claims 34-48. Claims 1-7, 9-13 (as amended) and 34-48 are pending in the instant Office action.

Priority

2. The instant application is granted the benefit of priority for the U.S. provisional Application No. 60/202466 filed on May 8, 2000 as requested in the declaration and the first lines of the specification.

Information Disclosure Statement

3. The information disclosure statement (IDS) filed on November 19, 2003 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. The following references were not considered for the reasons described below:

a) Copies of the references Huang *et al.,* Meurer and Hutchinson, Moche *et al.,* and Olsen *et al.* have not been received.

All other documents in said Information Disclosure Statement were considered as noted by the examiner's initials in the attached copy.

4. The information disclosure statements filed on May 5, 2005 has been reviewed, and its references have been considered as shown by the Examiner's initials next to each citation on the attached copy.

Compliance with Sequence Rules

5. The sequence listing, filed in computer readable form (CRF) and paper copy on November 19, 2003, has been received and entered. This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 C.F.R. § 1.821(a)(1) and (a)(2). However, this application fails to **fully** comply with the requirements of 37 C.F.R. § 1.821 through 1.825; Applicants' attention is directed to the final rulemaking notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990).

a) In Figures 3 and 3A-1 to 3A-79, two linear amino acid sequences are disclosed as part of the coordinate table without SEQ ID NO identification.

b) In Figures 5 and 5A-1 to 5A15, one two linear amino acid sequences are disclosed as part of the coordinate table without SEQ ID NO identification.

If the noted sequences are in the sequence listing as filed, Applicants must amend the specification to identify the sequences appropriately by SEQ ID NO. If the noted sequences are not in the sequence listing as filed, Applicants must provide (1) a substitute copy of the sequence listing in both computer readable form (CRF) and paper copy, (2) an amendment directing its entry into the specification, (3) a statement that the content of the paper and CRF copies are the

same and, where applicable, include no new matter as required by 37 C.F.R. § 1.821 (e) or 1.821(f) or 1.821(g) or 1.821(b) or 1.825(d), and (4) any amendment to the specification to identify the sequences appropriately by SEQ ID NO.

Objections to the Specification

6. The specification is objected to because the title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: ---Crystals of an acyl carrier protein synthase/acyl carrier protein complex---. The Examiner suggests that the full names for acyl carrier protein synthase and acyl carrier protein, given on pages 1 and 2 of the specification, should be included in the title because the acronyms ACPS and ACP do not clearly describe the invention.

7. The abstract of the disclosure is objected for not completely describing the disclosed subject matter (MPEP § 608.01(b)). It is noted that in many databases and in foreign countries the Abstract is crucial in defining the disclosed subject matter; thus, its completeness is essential. The Examiner suggests the inclusion of the source species of the crystallized acyl carrier protein synthase/acyl carrier protein complex, *Bacillus subtilis*, for completeness.

8. The specification is objected to for being confusing in Figure 3A-47 and Figure 5. Figure 3A-47 contains a residue numbered 0 and Figure 5 contains negative residue numbers (i.e. -5, -4, -3, -2 and -1), which is confusing. The Examiner does not find an explanation for the unusual numbering scheme used in the Figures. Do the zero and negative numbered residues represent non-naturally occurring residues/engineered residues that precede the naturally occurring ACP

amino acid sequence? Do the negative numbered residues represent a pre-protein sequence that is cleaved upon maturation of the sequence? Appropriate clarification is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 2-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "wherein ACPS comprises amino acid residues ARG14, MET18, ARG21 . . . .and PHE74 or conservative substitutions thereof" is unclear as to the metes and bounds of the claimed subject matter. It is unclear how to assess which residue of ACPS constitutes a particular position (i.e. 14, 18, 21) without a reference to a sequence listing. Furthermore, if the reference is *B. subtilis* ACPS (SEQ ID NO: 2), it is unclear how to determine what positions constitute comparable positions to, for example, 14, 18 and 21, in another ACPS which has conservative substitutions, without the benefit of reference to a sequence alignment. The phrase "wherein ACP comprises amino acid residues ARG14, LYS29, ASP35 . . ." in claims 4-5 is indefinite for the same reasons. Clarification is required.

10. Claims 9-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "An active site . . . comprising the structural coordinates" in the

claims is unclear as to the metes and bounds of the claimed subject matter. It is unclear what kind of product Applicant means to claim. Does Applicant mean to claim a polypeptide described by particular coordinates, a an arrangement of amino acids described by particular coordinates, or data comprising three-dimensional coordinates that describe the active site of a protein? The Examiner suggests using the language ---An acyl carrier protein synthase comprising the structural coordinates--- (for claims 9-10) or ---An acyl carrier protein comprising the structural coordinates--- (for claims 11-13). Clarification is required.

11. Claims 9-10, 34-36 and 39-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "an active site of an acyl carrier protein ***synthase*** comprising structural coordinates according to Figure 3 . . . of amino acid residues **ARG13, MET18** . . . ± a root mean square deviation from the **backbone atoms** of said amino acids" (emphasis added) in claim 9, and the same phrase in claims 10 and 34-36 with varying Figure numbers and side chains (i.e. Figure 3A-1 to 3A-79 and amino acid residues ASP13, LEU15 etc) are unclear and confusing. Must the active sites contain the side chain residues specified? If so, it is confusing that only the backbone atoms of the residues can deviate from those specified in the table, rather than the entire side-chain residues. If the active site must *not* contain the side chain residues specified, but only the backbone atoms associated with the side-chain residues specified, it is additionally unclear how to tell what constitutes a given position (i.e. 14, 18, 21) of the active site compared to those in Figures 3 or 3A-1 to 3A-79 (see previous 112, 2nd paragraph rejection). Clarification is required.

12. Claims 11-13, 37-38 and 45-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "an active site of an acyl carrier protein comprising structural coordinates according to Figure 3 . . . of amino acid residues **ARG14, LYS29** . . . ± a root mean square deviation from the **backbone atoms** of said amino acids" (emphasis added) in claim 11, and the same phrase in claims 12-13, 37-38 and 45-48 with varying Figure numbers and side chains (i.e. Figure 5A-1 to 5A-15 and amino acid residues ASP13, LEU15 etc) are unclear and confusing. Must the active sites contain the side chain residues specified? If so, it is confusing that only the backbone atoms of the residues can deviate from those specified in the table, rather than the entire side-chain residues. If the active site must *not* contain the side chain residues specified, but only the backbone atoms associated with the side-chain residues specified, it is additionally unclear how to tell what constitutes a given position (i.e. 14, 29 35) of the active site compared to those in Figures 3 or 3A-1 to 3A-79 (see previous 112, 2nd paragraph rejection).

In addition, Figure 3 contains 2 different amino acid sequences (i.e. the sequences in Figures 3, 3A-16 and 3A-31 are different from those in Figure 3A-47 and 3A57 and 3A67). It is unclear how to tell which sequence to which Applicant means to refer. Lastly, the phrase "structural coordinates according to Figure 3 . . . **or** Figure 5 . . .of amino acid residues . . " (emphasis) is additionally unclear. Figures 3 and 5 do not appear to contain the same sequence listing of amino acid residues or structural coordinates. If the structural coordinates for one amino acid are from Figure 3, must the remaining structural coordinates all be from Figure 3, or

can they come from any combination of Figures 3 and 5? Furthermore, does the Figure 3 or Figure 5 alone contain all of the amino acid residues listed in the claims? The same issue of indefiniteness applies to Figures 3A-1 to 3A-79 and 5A-1 to 5A-15 of the instant claims. Clarification on all of the above points is required.

13. Claims 39-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The instant claims recites the limitation "The **method** of Claim . . " (emphasis added). There is insufficient antecedent basis for this limitation in the claim. Does Applicant mean to claim ---the crystallized complex of claim . . ----? Clarification is required.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

14. Claims 1-7 and 34-48 are rejected under 35 U.S.C. 112, first paragraph, written description, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The instant claims are drawn to crystallized complexes of acyl carrier protein synthase (ACPS) and acyl carrier protein (ACP) (claim 1) with particular amino particular amino acid residues (claims 2-5) or with a particular space group and unit cell dimensions (claims 6-7) or described by structural coordinates similar

to those in Figures 3 and 3A-1 to 3A-79 (claims 34-48). While the structure of one species of said genera of crystallized complexes is disclosed in the specification, structural and functional limitations adequate to describe the instant genera of crystallized complexes are lacking.

The Court of Appeals for the Federal Circuit has recently held that a "written description of an invention involving a chemical genus, like a description of a chemical species, 'requires a precise definition, such as be structure, formula [or] chemical name,' of the claimed subject matter sufficient to distinguish it from other materials." University of California v. Eli Lilly and Co., 1997 U.S. App. LEXIS 18221, at *23, quoting Fiers v. Revel, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993) (bracketed material in original). To fully describe a genus of genetic material, which is a chemical compound, applicants must (1) fully describe at least one species of the claimed genus sufficient to represent said genus whereby a skilled artisan, in view of the prior art, could predict the structure of other species encompassed by the claimed genus and (2) identify the common characteristics of the claimed molecules, e.g., structure, physical and/or chemical characteristics, functional characteristics when coupled with a known or disclosed correlation between function and structure, or a combination of these.

In the instant specification, crystals of an ACPS-ACP complex with space group $C222_1$, unit cell parameters a=78.46 Å, b=122.03 Å and c=136.77 Å and having amino acid sequences given in Figure 1 (SEQ ID NO's 1 and 2) are disclosed (see pages 19-20). These crystals presumably have the structural coordinates given in Tables 3 and 3A-1 to 3A-79. These crystals are not representative of the claimed genera of crystallized complexes because a correlation of structure and function for the claimed genera is not disclosed. For each crystal, polypeptides having specific sequences are crystallized forming a specific crystal with particular unit cell

coordinates and space group. Such structure describes claims to protein crystals adequately. However, the instant claims are drawn to crystallized complexes of ACPS-ACP having unspecified space group and unit cell dimensions (claims 1-5 and 34-48) and/or amino acid sequences that are not adequately described (claims 1-7 and 34-48). The limitation that a crystal has amino acid residues within 1.5, 1.0 or 0.5 Å of a group of particular amino acid residues of a given sequence does not provide adequate written description because a complete amino acid sequence and specific unit cell dimensions and space group are required. For these reasons, the instant claims lack adequate written description. See also Case 4 of the Trilateral Project on protein 3D structure related claims at http://www.uspto.gov/web/tws/wm4/wm4_index.htm.

15. Claims 9-13 are rejected under 35 U.S.C. § 112, first paragraph, written description, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The instant claims are drawn to active sites of acyl carrier protein synthase (claims 9-10) or ACP (claims 11-13) with particular structural coordinates similar to those in Figures 3 or 5. While the structure of species of said genera of active sites is disclosed in the specification, structural and functional limitations adequate to describe the instant genera of ACPS and ACP proteins are lacking.

The Court of Appeals for the Federal Circuit has recently held that a "written description of an invention involving a chemical genus, like a description of a chemical species, 'requires a precise definition, such as be structure, formula [or] chemical name,' of the claimed subject matter sufficient to distinguish it from other materials." University of California v. Eli Lilly and

Co., 1997 U.S. App. LEXIS 18221, at *23, quoting Fiers v. Revel, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993) (bracketed material in original). To fully describe a genus of genetic material, which is a chemical compound, applicants must (1) fully describe at least one species of the claimed genus sufficient to represent said genus whereby a skilled artisan, in view of the prior art, could predict the structure of other species encompassed by the claimed genus and (2) identify the common characteristics of the claimed molecules, e.g., structure, physical and/or chemical characteristics, functional characteristics when coupled with a known or disclosed correlation between function and structure, or a combination of these (Enzo Biochem 63 USPQ2d 1609 (CAFC 2002)).

In Figures 3A-47 to 3A-77 and 5 and 5A-1 to 5A15 of the instant specification, an isolated polypeptide is disclosed that functions as an acyl carrier protein (ACP) and has a structure described by particular structural coordinates (and SEQ ID NO: 1). In Figures 3 and 3A-1 to 3A-47 of the instant specification, an isolated polypeptide is disclosed that functions as an acyl carrier protein synthase (ACPS) and has a structure described by particular structural coordinates (and SEQ ID NO: 2). The function of ACPS is disclosed as being to produce holo-ACP by transferring the P-pant moiety from CoA to apo-ACP. The function of ACP is not explicitly disclosed (it suggested to be involved in fatty acid synthesis). Applicants have described structural features of the genus relating to these structural coordinates and SEQ ID NOs: 1 and 2; however, sufficient functional characteristics relating to active sites of ACPS and ACP alone, and the common structural characteristics of the species in the instant genera of ACP and ACPS active sites that correlate to a functional limitation are lacking. In view of the prior art, one of skill in the art would be unable to predict the structure of other members of this genus

by virtue of the instant disclosure. Therefore, claims drawn to the instant genus of polypeptides are not adequately described.

16. Claims 1-7 and 34-48 are rejected under 35 U.S.C. 112, first paragraph, enablement. The claim(s) contain subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The instant claims are drawn to crystallized complexes of ACPS and ACP. To make the crystals and molecules that form crystals encompassed by the scope of the instant claims would require undue experimentation.

The factors to be considered in determining whether undue experimentation is required are summarized In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988). The Court in Wands states: "Enablement is not precluded by the necessity for some experimentation such as routine screening. However, experimentation needed to practice the invention must not be undue experimentation. The key word is 'undue,' not 'experimentation.' " (Wands, 8 USPQ2d 1404). Clearly, enablement of a claimed invention cannot be predicated on the basis of quantity of experimentation required to make or use the invention. "Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations." (Wands, 8 USPQ2d 1404). The factors to be considered in determining whether undue experimentation is required include: (1) the quantity of experimentation necessary, (2) the amount or direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the

breadth of the claims. While all of these factors are considered, a sufficient amount for a *prima facie* case is discussed below.

The instant specification discloses a species of a ACPS-ACP crystal complex with space group symmetry $C222_1$ and unit cell dimensions a=78.46 Å, b=122.03 Å and c=136.77 Å. on pages 19-25. The composition of this species is an equal mixture of polypeptides having SEQ ID NO's: 1 and 2 (see Figure 1). The preparation of the aforementioned molecules for crystallization is described on page 19. Hence, one working example of a crystal encompassed by the scope of the claims is provided.

However, neither the art nor the specification provide guidance on making ACPS-ACP crystal complexes with polypeptides having amino acid sequences and the space group and unit cell dimensions encompassed by the scope of the claims. In order to make the protein crystals, the following must be clear: the preparation and chemical composition of the molecules to be crystallized, and the crystallization conditions, including methods and reagents used. Crystallization experiments must be done in order to determine if a macromolecule will crystallize, and X-ray diffraction experiments must be done in order to determine if the crystalline macromolecule is encompassed by the scope of the claims. Small changes in any of the aforementioned factors can change the unit cell dimensions and space group symmetry of a crystal dramatically (Giege, 1994, see PTO-892; McPherson, 1995, see PTO-892); therefore, precise instruction about how to make protein crystals is required so that undue experimentation is not required. Due to the unpredictable nature of the art, specific information on how to make each crystal encompassed by the scope of the claims is required for enablement. One of skill in the art would be unable to predict how to make any members of the genus encompassed by the

scope the claims; to do so would require undue experimentation. Therefore, the instant claims are not enabled.

17. Claims 9-13 are rejected under 35 U.S.C. 112, first paragraph, scope of enablement, because the specification, while being enabling for polypeptides described by SEQ ID NO's: 1 and 2, does not reasonably provide enablement for the genera of all active sites of acyl carrier protein synthases (claims 9-10) or acyl carrier proteins (claims 11-13) described by particular structural coordinates similar to those in Figures 3 or 5. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The amount of experimentation required of one of skill in the art to use the claimed invention to the full extent of its scope is undue. The factors to be considered in determining whether undue experimentation is required are summarized In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988), are stated above. While all of these factors are considered, a sufficient amount for a *prima facie* case is discussed below.

The specification contains some working examples of ACPS polypeptides in Figure 2, including SEQ ID NO: 2. and some working examples of ACP in Figure 4, including SEQ ID NO: 1. The function of ACPS is disclosed as being to transfer a P-pant moiety to ACP involved in fatty acid biosynthesis. The function of ACP's is disclosed as playing a role in fatty acid biosynthesis by being modified by ACPS. The nature of the invention is such that the instant ACPS's and ACPS's have a distinct 3-dimensional structure determined by their *complete* amino acid sequences; and with a deviation from the *complete* known sequence, the predictability of

functionality becomes extremely low. The polypeptides encompassed by the scope of the claims are only required to have coordinates similar to the *active site* of an acyl carrier protein or acyl carrier protein synthase; however, in order to make an ACPS or ACP active site, an entire polypeptide must be synthesized. To make all the polypeptides with active sites described by particular residues included within the scope of the claims would be unpredictable because such a large deviation in polypeptide sequence is allowed. While ACPS and ACP molecules are known in the art, neither the specification nor the art provide guidance on how to make an ACPS or an ACP with such a large sequence variation. While the art describes methods for finding ACPS or ACP molecules with active sites included in the scope of the claims, these methods do not enable one of skill in the art to make all, or a relevant portion of, the molecules within the scope of the claims. The ability to find an ACPS or ACP molecule with a particular active site is not equivalent to the ability to make a mutant strain as required by the statute (i.e., "make and use"). One of ordinary skill in the art would be unable to make all of the molecules included in the scope of the claims. The breadth of the claims and the unpredictability of the art render the instant claims not enabled to the full extent of their scope without undue experimentation.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

18. Claims 9-13 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. The claims are drawn to active sites of acyl carrier protein synthase (claims 9-10) or acyl carrier protein (claims 11-13) described by particular structural

coordinates similar to those in Figures 3 and 3A-1 to 3A-79 or 5A and 5A-1 to 5A-15. The claims, as written, do not sufficiently distinguish over active sites of acyl carrier protein synthases or acyl carrier proteins as they naturally exist because the claims do not particularly point out any non-naturally occurring differences between the claimed products and the naturally occurring products. In the absence of the hand of man, the naturally occurring products are considered non-statutory subject matter. The claim should be amended to indicate the hand of the inventor, e.g. by insertion of "purified" or "isolated" as taught on pages 19 and 26 of the specification. See Diamond v. Chakrabarty, 447 U.S. 303, 206, USPQ 193 (1980).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

19. Claims 9-12 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kunst *et al.* (see PTO-892) as evidenced by Genbank Accession Number Z99106 and Z99112 (see PTO-892). The instant claims are drawn to active sites of an acyl carrier protein synthase comprising particular structural coordinates similar to those in Figures 3, and 3A-1 to 3A-79 and active sites of acyl carrier protein comprising structural coordinates similar to those in Figures 3, and 3A-1 to 3A-79 or Figure 5 and 5A-1 to 5A-15.

Kunst *et al.* teach the acyl carrier protein synthase from *Bacillus subtilis,* named *ydcB*, and acyl carrier protein from *Bacillus subtilis*, named acpA (see Table 1, page 263, column 3). The amino acid sequence of the acyl carrier protein synthase taught by Kunst *et al.* matches the amino acid sequence disclosed in Figures 3 and 3A-1 to 3A-19 (SEQ ID NO: 2), as evidenced by Genbank Accession Number Z99106 (also see attached sequence comparison to SEQ ID NO: 2). The amino acid sequence of the acyl carrier protein taught by Kunst *et al.* matches the amino acid sequence disclosed in Figures 3 and 3A-1 to 3A-19 and 5A-1 to 5A-15 (SEQ ID NO: 1), as evidenced by Genbank Accession Number Z99112 (also see attached sequence comparison to SEQ ID NO: 1). The three dimensional structure of a protein is an inherent feature of a polypeptide that is related to its amino acid sequence. Thus, the ACPS and ACP taught by Kunst *et al.* inherently have an active site described by particular structure coordinates similar to those indicated in claims 9-13 and disclosed in Figure 3 and Figures 3A-1 to 3A-19 or Figure 5 and 5A-1 to 5A-15.

Other Art for Comment/Examiner's Suggestions

20. The following are cited to complete the record:

a) Huang *et al.* teach crystals of *E. coli* β-ketoacyl-acyl carrier protein synthase II, an acyl carrier protein synthase; however, they do not teach acyl carrier protein or a crystallized *complex* of acyl carrier protein synthase with acyl carrier protein.

b) Kunst *et al.* teach *Bacillus subtilis* ACP (see PTO-892); however the ACP taught by Kunst *et al.* does anticipate claim 13 because it lacks the 5 most N-terminal amino acids described in Figure 5 (SEQ ID NO: 1) (see attached sequence comparison).

Conclusion

21. Claims 1-7, 9-13 and 34-48 are rejected for the reasons identified in the numbered sections of the Office action. Applicants must respond to the objections/rejections in each of the numbered sections in the Office action to be fully responsive in prosecution.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lindsay Odell whose telephone number is 571-272-3445. The examiner can normally be reached on M-F, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathleen Kerr can be reached on 571-272-0931. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lindsay Odell, Ph.D.
July 7, 2005

KATHLEEN KERR, PH.D.
PRIMARY EXAMINER
SPE